What is claimed is:

[Claim 1] A method for preparing a specimen for application of microanalysis thereto, the method comprising:

forming an initial conductive layer over an area of interest, said initial conductive layer formed through a low-energy beam deposition process;
removing a volume of material surrounding said area of interest by forming a pair of trenches in a bulk material having said area of interest formed thereon, thereby forming a membrane including said area of interest and said initial conductive layer over said area of interest; and
removing said membrane from said bulk material.

[Claim 2] The method of claim 1, wherein said low-energy beam deposition process comprises electron beam deposition.

[Claim 3] The method of claim 2, wherein said initial conductive layer further comprises at least one of: platinum, tungsten, gold, aluminum, titanium, and combinations thereof.

[Claim 4] The method of claim 1, wherein said initial conductive layer is formed at a thickness of about 10 nanometers (nm) to about 100 nm.

[Claim 5] The method of claim 4, wherein said initial conductive layer is formed over an area of about 1 micron by about 10 microns.

[Claim 6] The method of claim 4, further comprising implementing a high-energy beam deposition process for increasing the thickness of said initial conductive layer.

[Claim 7] The method of claim 6, wherein said high-energy beam deposition process comprises ion beam deposition.

[Claim 8] The method of claim 1, wherein said removing a volume of material surrounding said area of interest is implemented by focused ion beam milling.

[Claim 9] A method for preparing a specimen for application of microanalysis thereto, the method comprising:

forming an initial conductive layer over a defined area of interest on a semiconductor substrate, said initial conductive layer formed through an electron beam deposition process;
removing a volume of substrate material surrounding said area of interest, thereby forming the specimen, including said area of interest and said initial conductive layer over said area of interest; and
removing the specimen from said bulk substrate material.

[Claim 10] The method of claim 9, wherein the microanalysis comprises tunneling electron microscopy (TEM).

[Claim 11] The method of claim 10, wherein said initial conductive layer further comprises at least one of: platinum, tungsten, gold, aluminum, titanium, and combinations thereof.

[Claim 12] The method of claim 9, wherein said initial conductive layer is formed at a thickness of about 10 nanometers (nm) to about 100 nm.

[Claim 13] The method of claim 12, wherein said initial conductive layer is formed over an area of about 1 micron by about 10 microns.

[Claim 14] The method of claim 12, further comprising implementing a high-energy beam deposition process for increasing the thickness of said initial conductive layer.

[Claim 15] The method of claim 14, wherein said high-energy beam deposition process comprises ion beam deposition.

[Claim 16] The method of claim 9, wherein said removing a volume of substrate material surrounding said area of interest is implemented by focused ion beam milling.